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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/689,395	10/20/2003	Satoshi Omori	F-8004	3991
28107	7590	06/30/2006	EXAMINER	
JORDAN AND HAMBURG LLP 122 EAST 42ND STREET SUITE 4000 NEW YORK, NY 10168			HARPER, LEON JONATHAN	
			ART UNIT	PAPER NUMBER
			2166	

DATE MAILED: 06/30/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/689,395	Applicant(s) OMORI, SATOSHI	
	Examiner Leon J. Harper	Art Unit 2166	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 October 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>6/20/2006</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This office action is in response to application 10689395 filed on 10/20/2003.

Claims 1-26 are pending.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Regarding claim 10, the phrase " standard sequence " renders the claim(s) indefinite because there is no definite definition of a standard sequence thereby rendering the scope of the claim(s) unascertainable. See MPEP § 2173.05(d).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Natural sequence code representations for compression and rapid searching of human-genome style databases (hereinafter Rapid) in view of Compression of Nucleotide databases for fast searching (hereinafter Fast) in further view of Math World (hereinafter Math).

As for claim 1 Rapid discloses: dividing one of text representing a sequence of said biological compounds and numerical data obtained by converting said text data utilizing a conversion rule, into a plurality of m-bit partial data arranged in a plurality of columns in an arranged direction corresponding to a direction along which said biological compounds are placed and in a plurality of rows in a non-arranged direction which crosses said arranged direction (See page 284 column 1 paragraph 2), where m is an integer greater than or equal to 16 (See page 286 column 1 paragraph 1);

While Rapid does not differ substantially from the claimed invention the disclosure of computing a first set of parity information by applying a first operation of a Galois field $GF(2^m)$ along said non-arranged direction to a set of said partial data of each column; computing a second set of parity information by applying a second operation of a Galois field GF along said arranged direction to a set of said partial data of each row; and representing said sequence information on said biological compounds by said first and second sets of parity information is not necessarily explicit. Fast discloses: computing a first set of parity information (See page 551 column 1 section 4

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Huffman coding). Math World discloses: a Galois field GF that can be applied to anything (See page 1). It would have been obvious to an artisan of ordinary skill in the pertinent art to have incorporated, the teaching on Math World and Fast into the system of Rapid. The modification would have been obvious because the parity and Galois field information is used as another form of compressions and both fast and Rapid discloses databases (See fast page 549 column 2 section 2)

As for claim 2, the rejection of claim 1 is incorporated, and further Math World discloses: when a is a primitive element of a Galois field $GF(2^m)$, said first set of parity information includes a sum of a plurality of products obtained by multiplying a set of said partial data of each column along direction by $a^{S(p+1)}, a^{S(p+2)}, \dots, a^{S(p+dp)}$ where S and P nonnegative integers and dp is an integer greater than or equal to one; and said second set of parity information includes a sum of a plurality of products obtained by multiplying a set of said partial data of each row along said $a^{tq}, a^{t(q+1)}, \dots$ where t and q are nonnegative integers and dq is an integer greater than or equal to one (See page 1 and 2 of math world note: it show the polynomial breakdown of a Galois field.

As for claim 3, the rejection of claim 1 is incorporated, and further Rapid discloses: a number of said partial data placed along said arranged direction is smaller than a number of said partial data placed along said non-arranged direction and a number of said second set of parity information is smaller than a number of said first set of parity information (See page 285 column 2 paragraph 3).

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As for claim 4, the rejection of claim 3 is incorporated, and further discloses: wherein said number of partial data placed along said non-arranged direction is less than or equal to $(s^{m-1})/4$ (See page 285 column 2 paragraph 3 note: 5 bits is always less than $s^{m-1}/4$).

As for claim 5, the rejection of claim 2 is incorporated, and further Math World discloses: wherein both of said integers s and t are zero (See page 1 note: then $Gf(1)$ you get 0).

As for claim 6, the rejection of claim 2 is incorporated, and further Math World discloses: wherein both of said integers s and t are one (See page 1 note: then $Gf(2)$ then the second polynomial has only 1's).

As for claim 7, the rejection of claim 2 is incorporated, and further Math World discloses: wherein said first set of parity information includes a plurality of said sums obtained for each column using mutually different values of said integer s ; and said second set of parity information includes a plurality of said sums obtained for each row using mutually different values of said integer t (See page 1 this is a Galois calculated according to the column numbers).

As for claim 8, the rejection of claim 1 is incorporated, and further Rapid discloses: wherein said partial data is said numerical data obtained by expressing each

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of said biological compounds as data having size less than or equal to six bits (See page 285 column 2 paragraph 3 note: 5 bits is less than 6).

As for claim 9, the rejection of claim 1 is incorporated, and further Rapid discloses: wherein said integer that defines said Galois field GF is a multiple of 64 (See page 285 column 1 paragraph 3 note: Math world discloses a galois and in Rapid 8 is a multiple of 64).

As for claim 10, the rejection of claim 1 is incorporated, and further Fast discloses: computing two sets of parity information one sequence of biological compounds subject to examination, said two sets of parity information on said sequence of biological compounds subject to examination corresponding to said two sets of parity information on said standard sequence; and identifying differences between said standard sequence and said sequence of biological compounds subject to examination, by using said two sets of parity information on said standard sequence and said two sets of parity information on said sequence of biological compounds subject to examination (See page 552 column 1).

As for claim 11, the rejection of claim 1 is incorporated, and further Rapid discloses: wherein said biological compounds are nucleotides constituting at least part of DNA, RNA or a gene (See page 287 column 2).

As for claim 12, the rejection of claim 1 is incorporated and further Rapid discloses: wherein said biological compounds are amino acids constituting at least part of a protein (See page 287 column 2).

Claims 13 and 14 are device claims corresponding to the method of claims 1 and 2 respectively and are thus rejected for the same reasons as set forth in the rejection of claims 1 and 2 respectively.

Claim 15 is a computer –readable medium claim corresponding to the method of claim 1 and is thus rejected for the same reasons set forth in the rejection of claim 1.

As for claim 16, the rejection of claim 15 is incorporated, and further Fast discloses: wherein said data structure further includes a mathematical digest of one of said text data representing said sequence of said biological compounds and said numerical data corresponding to said text data, and said mathematical digest has a size greater than or equal to 40 bits (See page 551 section 5 direct coding).

Claim 17 is a method for supplying sequence information corresponding to the method of claim 1 and is thus rejected for the same reasons as set forth in the rejection of claim 1.

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As for claim 18, the rejection of claim 17 is incorporated, and further Fast discloses: identifying differences between said sequence of said biological compounds held by said supplier and a sequence of biological compounds subject to examination, based on said two sets of received parity information and when said differences cannot be recovered, (See page 552 column 1). It would have been obvious to an artisan of ordinary skill in the pertinent art to have incorporated receiving sequence information on a part corresponding to said differences within said one of text data and numerical data recorded in said first file through said communication network from said supplier into the system of Fast, Rapid and Math world. The modification would have been obvious because with the evolution of the Internet and lans work is mostly distributed to different computers or done by a supplier and sent though a communications feed.

As for claim 19, the rejection of claim 18 is incorporated, and further discloses: when a is a primitive element of a Galois field $GF(2^m)$, said first set of parity information includes a sum of a plurality of products obtained by multiplying a set of said partial data of each column along direction by $a^{s(p+1)}, a^{s(p+2)} \dots a^{s(p+d_p)}$ where S and P nonnegative integers and d_p is an integer greater than or equal to one; and said second set of parity information includes a sum of a plurality of products obtained by multiplying a set of said partial data of each row along said $a^{tq}, a^{t(q+1)} \dots$ where t and q are nonnegative integers and d_q is an integer greater than or equal to one (See page 1 and 2 of math world note: it show the polynomial breakdown of a Galois field.

As for claim 20, the rejection of claim 17 is incorporated, and further discloses: providing information on a number of said sequence of said biological compounds, and information on a mathematical digest of said one of text data and numerical data through said communications network (See page 552 column 1). It would have been obvious to an artisan of ordinary skill in the pertinent art to have incorporated receiving sequence information on a part corresponding to said differences within said one of text data and numerical data recorded in said first file through said communication network from said supplier into the system of Fast, Rapid and Math world. The modification would have been obvious because with the evolution of the Internet and lans work is mostly distributed to different computers or done by a supplier and sent though a communications feed.

Claim 21 is recording method substantially corresponding to the method of claim 1 and is thus rejected for the same reasons as set forth in the rejection of claim 1.

As for claim 22, the rejection of claim 21 is incorporated, and further Fast discloses: wherein said maximum value N_{max} of said partial data is smaller than $(2^m - 1)$ and said prime number P satisfies the following condition $2^m > P > N_{max}$ (See page 552 table 4 note P verte is always less than N_{max} or Genbank).

Claims 23-26 are method claims corresponding to claims 2,1,20,18,20 respectively and are thus rejected for the same reasons as set forth in the rejection of claims 2,1,20,18,20.

Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leon J. Harper whose telephone number is 571-272-0759. The examiner can normally be reached on 7:30AM - 4:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hosain T. Alam can be reached on 571-272-3978. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


MOHAMMAD ALI
PRIMARY EXAMINER

LJH
Leon J. Harper
June 20, 2006